

Claims:

1. A method of vaccinating a mammal against a disease state, comprising
5 administering to said mammal, within an appropriate vector, a nucleotide
sequence encoding an antigenic peptide associated with the disease state;
additionally administering to said mammal a compound which
enhances both humoral and cellular immune responses initiated by the antigenic
peptide, the compound being selected from:
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- 4-(2-formyl-3-hydroxyphenoxy)methyl)benzoic acid;
5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N,N-diethyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N-isopropyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
15 ethyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-(2-formyl-3-hydroxyphenoxy)pentanonitrile;
(\pm)-5-(2-formyl-3-hydroxyphenoxy)-2-methylpentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-2,2-dimethylpentanoic acid;
methyl 3-(2-formyl-3-hydroxyphenoxy)methylbenzoate;
20 3-(2-formyl-3-hydroxyphenoxy)methylbenzoic acid;
benzyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-[4-(2-formyl-3-hydroxyphenoxy)-N-butyl]tetrazole;
7-(2-formyl-3-hydroxyphenoxy)heptanoic acid;

- 5-(2-formyl-3-hydroxy-4-n-propoxyphenoxy)pentanoic acid;
5-(4,6-dichloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-N-methylsulphonylpentanamide;
ethyl 4-(2-formyl-3-hydroxyphenoxymethyl)benzoate;
- 5 5-(4-chloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(3-acetylamino-2-formylphenoxy)pentanoic acid;
Aminoguanidine;
4-(2-formyl-3-hydroxyphenoxy)butanoic acid;
6-(2-formyl-3-hydroxyphenoxy)hexanoic acid;
- 10 ethyl 4-(3-acetylamino-2-formylphenoxymethyl)benzoate;
4-(3-acetylamino-2-formylphenoxymethyl)benzoic acid;
2-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-[4-(2-formyl-3-hydroxyphenoxymethyl)phenyl]tetrazole;
5-(2-formyl-3-hydroxy-4-methoxyphenoxy)pentanoic acid;
- 15 3-(2-formyl-3-hydroxyphenoxy)propionitrile;
4-Hydroxyphenylacetaldehyde;
Phenylacetaldehyde;
4-Methoxyphenylacetaldehyde;
1-hydroxy-2-phenylpropane;
- 20 3-Phenylpropanal;
4-Nitrobenzaldehyde;
Methyl 4-formylbenzoate;
4-Chlorobenzaldehyde;

- 4-Methyloxybenzaldehyde;
- 4-Methylbenzaldehyde;
- 8,10-Dioxoundecanoic acid;
- 4,6-Dioxoheptanoic acid;
- 5 Pentanedione;
- 5-methoxy-1-tetralone;
- 6-methoxy-1-tetralone;
- 7-methoxy-1-tetralone;
- 2-tetralone;
- 10 3-hydroxy-1-(4-methoxyphenyl)-3-methyl-2-butanone;
- 2',4'-dihydroxy-2-(4-methoxyphenyl)acetophenone;
- 2-hydroxy-1-(4-methoxyphenyl)-pent-2ene-4one;
- Naringenin 4',5,6-trihydroxyflavonone;
- 4'-methoxy-2-(4-methoxyphenyl)acetophenone;
- 15 6,7-dihydroxycoumarin;
- 7-methoxy-2-tetralone;
- 6,7-dimethoxy-2-tetralone;
- 6-hydroxy-4-methylcoumarin;
- Homogentisic acid gamma lactone;
- 20 6-hydroxy-1,2-naphthoquinone;
- 8-methoxy-2-tetralone;

and physiologically acceptable salts thereof, where appropriate.

2. The method according to claim 1 wherein administration of the compound takes place on between one and seven occasions, between about 14 days prior to and about 14 days post administration of the nucleotide sequence.

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3. The method according to claim 1 wherein administration of the compound takes place on between one and seven occasions, between about 7 days prior to and about 7 days post administration of the nucleotide sequence.

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4. The method according to claim 1 wherein administration of the compound takes place between about 24 hours prior to and about 24 hours post administration of the nucleotide sequence.

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5. The method according to claim 1 wherein administration of the compound is substantially simultaneous with administration of the nucleotide sequence.

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6. The method according to any one of claims 1 to 5 which is repeated between 1 and 4 times, at intervals of between about 1 day and about 18 months.

7. The method according to any one of claims 1 to 6 wherein administration of the nucleotide sequence is via the oral, nasal, pulmonary, intramuscular, subcutaneous or intradermal routes.

5 8. The method according to claim 7 wherein the nucleotide sequence is administered using a gene-gun delivery technique.

9. The method according to any one of claims 1 to 8 wherein administration of the compound is via the oral, nasal, pulmonary, intramuscular,
10 subcutaneous, intradermal or topical routes.

10. The method according to any one of claims 1 to 8 wherein the compound is administered using a gene-gun delivery technique.

15 11. The method according to either claim 9 or claim 10 wherein the compound is administered at a dose of between about 0.1mg and about 100 mg/per kg per administration.

12. The method according to any one of claims 1 to 11 wherein the
20 mammal is a human.

13. The method according to any one of claims 1 to 12 wherein the compound is 4-(2-formyl-3-hydroxyphenoxyethyl)benzoic acid.

14. A vaccine composition comprising a nucleotide sequence which encodes for an antigenic peptide associated with a disease state and which is within an appropriate vector, and a compound which will enhance both humoral and cellular immune responses in a mammal which are initiated by the antigenic peptide, the compound being selected from:

4-(2-formyl-3-hydroxyphenoxy)methyl)benzoic acid;

5-(2-formyl-3-hydroxyphenoxy)pentanamide;

10 N,N-diethyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;

N-isopropyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;

ethyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;

5-(2-formyl-3-hydroxyphenoxy)pentanonitrile;

(±)-5-(2-formyl-3-hydroxyphenoxy)-2-methylpentanoic acid;

15 5-(2-formyl-3-hydroxyphenoxy)-2,2-dimethylpentanoic acid;

methyl 3-(2-formyl-3-hydroxyphenoxy)methylbenzoate;

3-(2-formyl-3-hydroxyphenoxy)methylbenzoic acid;

benzyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;

5-[4-(2-formyl-3-hydroxyphenoxy)-N-butyl]tetrazole;

20 7-(2-formyl-3-hydroxyphenoxy)heptanoic acid;

5-(2-formyl-3-hydroxy-4-n-propoxyphenoxy)pentanoic acid;

5-(4,6-dichloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;

5-(2-formyl-3-hydroxyphenoxy)-N-methylsulphonylpentanamide;

- ethyl 4-(2-formyl-3-hydroxyphenoxy)methyl)benzoate;
5-(4-chloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(3-acetylamino-2-formylphenoxy)pentanoic acid;
Aminoguanidine;
- 5 4-(2-formyl-3-hydroxyphenoxy)butanoic acid;
6-(2-formyl-3-hydroxyphenoxy)hexanoic acid;
ethyl 4-(3-acetylamino-2-formylphenoxy)methyl)benzoate;
4-(3-acetylamino-2-formylphenoxy)methyl)benzoic acid;
2-(2-formyl-3-hydroxyphenoxy)methyl)benzoic acid;
- 10 5-[4-(2-formyl-3-hydroxyphenoxy)methyl)phenyl]tetrazole;
5-(2-formyl-3-hydroxy-4-methoxyphenoxy)pentanoic acid;
3-(2-formyl-3-hydroxyphenoxy)propionitrile;
4-Hydroxyphenylacetaldehyde;
Phenylacetaldehyde;
- 15 4-Methoxyphenylacetaldehyde;
1-hydroxy-2-phenylpropane;
3-Phenylpropanal;
4-Nitrobenzaldehyde;
Methyl 4-formylbenzoate;
- 20 4-Chlorobenzaldehyde;
4-Methoxybenzaldehyde;
4-Methylbenzaldehyde;
8,10-Dioxoundecanoic acid;

- 4,6-Dioxoheptanoic acid;
- Pentanedione;
- 5-methoxy-1-tetralone;
- 6-methoxy-1-tetralone;
- 5 7-methoxy-1-tetralone;
- 2-tetralone;
- 3-hydroxy-1-(4-methoxyphenyl)-3-methyl-2-butanone;
- 2',4'-dihydroxy-2-(4-methoxyphenyl)acetophenone;
- 2-hydroxy-1-(4-methoxyphenyl)-pent-2-ene-4-one;
- 10 Naringenin 4',5,6-trihydroxyflavonone;
- 4'-methoxy-2-(4-methoxyphenyl)acetophenone;
- 6,7-dihydroxycoumarin;
- 7-methoxy-2-tetralone;
- 6,7-dimethoxy-2-tetralone;
- 15 6-hydroxy-4-methylcoumarin;
- Homogentisic acid gamma lactone;
- 6-hydroxy-1,2-naphthoquinone;
- 8-methoxy-2-tetralone;
- 20 namely and physiologically acceptable salts thereof, where appropriate.

15. The vaccine composition according to claim 14 which is in a form suitable for administration via the oral, nasal, pulmonary, intramuscular, subcutaneous or intradermal route.

5 16. The vaccine composition according to claim 14 which is in a form suitable for administration using a gene-gun delivery technique.

17. The vaccine composition according to any one of claims 14 to 16 wherein the compound is 4-(2-formyl-3-hydroxyphenoxy)methyl)benzoic acid.

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18. Use of a compound in the manufacture of a medicament, wherein administration of the compound to a mammal enhances both humoral and cellular responses initiated by an antigenic peptide associated with a disease state, peptide being expressed as a result of administration to said mammal of a
15 nucleotide sequence encoding for the peptide;

wherein said compound is selected from:

4-(2-formyl-3-hydroxyphenoxy)methyl)benzoic acid;

20 5-(2-formyl-3-hydroxyphenoxy)pentanamide;

N,N-diethyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;

N-isopropyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;

ethyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;

- 5-(2-formyl-3-hydroxyphenoxy)pentanonitrile;
(±)-5-(2-formyl-3-hydroxyphenoxy)-2-methylpentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-2,2-dimethylpentanoic acid;
methyl 3-(2-formyl-3-hydroxyphenoxy)methylbenzoate;
5 3-(2-formyl-3-hydroxyphenoxy)methylbenzoic acid;
benzyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-[4-(2-formyl-3-hydroxyphenoxy)-N-butyl]tetrazole;
7-(2-formyl-3-hydroxyphenoxy)heptanoic acid;
5-(2-formyl-3-hydroxy-4-n-propoxyphenoxy)pentanoic acid;
10 5-(4,6-dichloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-N-methylsulphonylpentanamide;
ethyl 4-(2-formyl-3-hydroxyphenoxymethyl)benzoate;
5-(4-chloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(3-acetylamino-2-formylphenoxy)pentanoic acid;
15 Aminoguanidine;
4-(2-formyl-3-hydroxyphenoxy)butanoic acid;
6-(2-formyl-3-hydroxyphenoxy)hexanoic acid;
ethyl 4-(3-acetylamino-2-formylphenoxymethyl)benzoate;
4-(3-acetylamino-2-formylphenoxymethyl)benzoic acid;
20 2-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-[4-(2-formyl-3-hydroxyphenoxymethyl)phenyl]tetrazole;
5-(2-formyl-3-hydroxy-4-methoxyphenoxy)pentanoic acid;
3-(2-formyl-3-hydroxyphenoxy)propionitrile;

- 4-Hydroxyphenylacetaldehyde;
Phenylacetaldehyde;
4-Methoxyphenylacetaldehyde;
1-hydroxy-2-phenylpropane;
5 3-Phenylpropanaldehyde;
4-Nitrobenzaldehyde;
Methyl 4-formylbenzoate;
4-Chlorobenzaldehyde;
4-Methoxybenzaldehyde;
10 4-Methylbenzaldehyde;
8,10-Dioxoundecanoic acid;
4,6-Dioxoheptanoic acid;
Pentanedione;
5-methoxy-1-tetralone;
15 6-methoxy-1-tetralone;
7-methoxy-1-tetralone;
2-tetralone;
3-hydroxy-1-(4-methoxyphenyl)-3-methyl-2-butanone;
2',4'-dihydroxy-2-(4-methoxyphenyl)acetophenone;
20 2-hydroxy-1-(4-methoxyphenyl)-pent-2-en-4-one;
Naringenin 4',5,6-trihydroxyflavonone;
4'-methoxy-2-(4-methoxyphenyl)acetophenone;
6,7-dihydroxycoumarin;

- 7-methoxy-2-tetralone;
6,7-dimethoxy-2-tetralone;
6-hydroxy-4-methylcoumarin;
Homogentisic acid gamma lactone;
5 6-hydroxy-1,2-naphthoquinone;
8-methoxy-2-tetralone;

and physiologically acceptable salts thereof, where appropriate.

- 10 19. The use according to claim 18 wherein the medicament is in a form
suitable for administration via the oral, nasal, pulmonary, intramuscular,
subcutaneous or intradermal routes.
- 15 20. The use according to claim 19 wherein the medicament is in a form
suitable for administration using a gene-gun delivery technique.
- 21 21 The use according to any one of claims 18 to 20 wherein the
compound is 4-(2-formyl-3-hydroxyphenoxyethyl)benzoic acid.
- 20 22. The use according to any one of claims 18 to 21 wherein the
compound is administered at a dose of between about 0.1 mg/kg and 100 mg/kg
per administration.

23. The use according to anyone of claims 18 to 22 wherein the medicament further comprises the nucleotide sequence.

24. A combination of components for separate, sequential or concomitant administration in a method according to claim 1, comprising the nucleotide sequence encoding an antigenic peptide and the compound which enhances both cellular and humoral immune responses initiated by the antigenic peptide.